

REMARKS

This paper is presented in response to the final official action of March 5, 2009, wherein (a) claims 1-30 were pending, (b) claims 19-30 were withdrawn from consideration, (c) claims 1-4, 6, 7, and 9-18 were rejected as obvious over Joo et al., US 6,277,324 ("Joo") in view of Hoffmann et al., US 3,897,183 ("Hoffmann") and Fayed (Roll Pressing, in Handbook of Powder Science and Technology, 2nd Ed., eds. M.E. Fayed and L. Otten, 1997, p. 345-363) ("Fayed"), (d) claim 5 was rejected as obvious over Joo in view of Hofmann and Fayed and further in view of Freytag et al., US 6,074,456 ("Freytag"), and (e) claim 8 was rejected as obvious over Joo in view of Hofmann and Fayed and further in view of McClelland et al., US 6,352,573 ("McClelland").

This response is timely filed, and accompanies a request for continued examination and the requisite fee.

By the foregoing, claims 1 and 9 are amended. Support for the amendments to claims 1 and 9 can be found in the specification at page 7, lines 15-22 and figure 3. No new matter has been introduced.

Reconsideration and allowance of the present application based on the foregoing amendments and following remarks are respectfully requested. The issues raised in the outstanding action are addressed below in the order in which they appear in the action.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-18 have been rejected under 35 U.S.C. § 103(a) as being obvious over Joo in view of Hoffmann and Fayed together or in further view of Freytag or McClelland. These rejections are respectfully traversed; reconsideration is requested.

Independent claims 1 and 9 recite a method for manufacturing molten iron comprising roll-pressing reduced material through at least one pair of roller presses

to produce a continuous compacted material having protruded portions adjacent to each other and line-shaped concave grooves formed between the protruded portions on pressed surfaces. The method further includes forming the protruded portions and the line-shaped concave grooves uniformly and continuously on an outer surface of the compacted materials along an axial direction of the one pair of roller presses.

The grooves are non-aligned to produce compacted material as recited in claims 1 and 9 and as shown, for example, in Figure 1 below. In claim 1, the compacted material is formed such that acute and obtuse angles are formed between a center line formed along a length of a cross section that is cut along a lengthwise direction perpendicular to an axial direction of the roller presses and connecting lines that connect the line-shaped concave grooves closest to each other across the cross sectional area. See, for example, Figure 1, below. Claim 9 recites a groove of a second surface is positioned between two adjacent grooves of a first surface. See, for example, Figure 1, below. Dependent claims 2-8 and 10-18 recite additional features of the methods of claims 1 and 9, respectively.

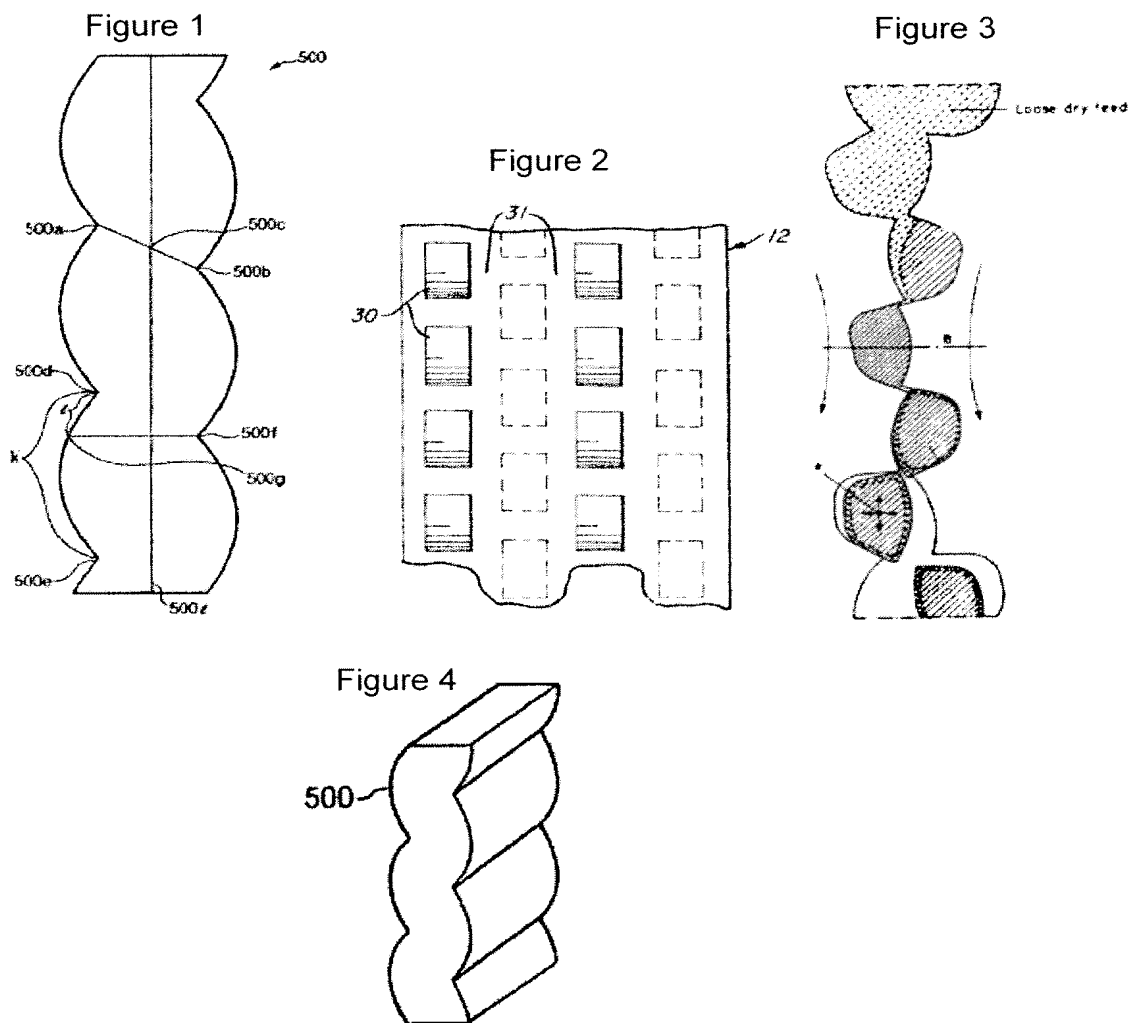
A proper analysis for obviousness requires that “the scope and content of the prior art are ... determined; differences between the prior art and the claims at issue are ... ascertained; and the level of ordinary skill in the pertinent art resolved.” *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 148 USPQ 459 (1966). Thus, the analysis must include a discussion of the prior art on which the examiner relies. Just as the examiner has addressed the references individually in setting out the rejection, the applicants offer in rebuttal a discussion of what the individual references disclose. This rebuttal discussion cannot be construed as an attack on the references individually; it is simply a discussion of what the individual references disclose so as to ascertain whether the combined teachings support the examiner’s assertion of obviousness.

Joo discloses an apparatus and method for manufacturing molten pig iron with fine iron ore in multiple fluidized beds. Joo further discloses a briquetting

device, which forms reduced iron briquettes. Joo fails to disclose forming compacted material in the shape recited in the pending claims.

Hoffmann discloses an apparatus for forming briquettes, as shown in Figure 2, below. However, Hoffmann fails to disclose a method for manufacturing molten iron ore or compacted material in the shape recited in the pending claims. *Compare*, for example, Figure 1 and Figure 2, below. As recited in the amended claims, the compacted material is formed so that the protruded portions (for example, k in Fig. 1) and the line-shaped concave grooves (for example, 500d in Fig. 1) are uniformly and continuously formed on an outer surface of the compacted materials along an axial direction of the one pair of roller presses. See, for example, Fig. 4 below. The lumps of Hoffmann are discontinuous across a surface of the material, where the lumps on one side (denoted by solid lines) are separated by flat portions (denoted by 31 and dotted lines). See Fig. 2. Therefore, the lumps of Hoffmann are not uniform and continuous, as recited by the amended claims. Further, Hoffmann fails to provide a motivation to change the shapes of the lumps in Hoffmann because the lumps are meant to easily break apart and separate into the briquettes. Hoffmann at col. 2, lines 12-16. In contrast, the compacted material of the pending claims prevents breaking or splitting of the compacted material. See the present application at page 24, lines 1-3.

Fayed discloses general roll-pressing techniques, including briquetting. Fayed discloses briquettes, as shown in Figure 3, below. However, Fayed also fails to disclose compacted material in the shape recited in the pending claims. The briquettes of Fayed do not have protruded portions and line-shaped concave grooves formed uniformly and continuously on an out surface of the compacted materials along an axial direction of the one pair of roller presses, as recited in the amended claims. *Compare* Figure 1 and Figure 3, below. Similar to Hoffmann, the material of Fayed is meant to easily break apart and separate into briquettes. Fayed at page 345. In contrast, the compacted material of the pending claims prevents breaking or splitting of the compacted material prior to crushing. See the application at page 24, lines 1-3.



Joo, Hoffmann, and Fayed fail to teach the shape of the compacted material as recited in the pending claims; instead the references disclose and suggest briquettes. The compacted material of the present application is not a briquette. Briquettes are formed when "rows of identical pockets are machined into the working surface and the rollers are timed such that the pocket halves exactly match." Fayed at 345. In contrast, the compacted material of the amended claims is not formed as briquettes, as shown in Figure 1, above. Therefore, the combined references fail to teach the shape of the compacted material as recited in the amended claims. In addition, there is no reason to modify the briquettes of Hoffmann and Fayed to form the shape of the compacted material of the pending claims.

Similarly, McClellan and Freytag teach briquetting and fail to teach the shape of the compacted material recited in the pending claims. Therefore, McClellan and Freytag also fail to provide the motivation to alter the shape of the briquettes of Hoffmann and Fayed.

In addition, Joo, Hoffmann, and Fayed fail to teach or suggest the advantages associated with the shape of the compacted material. For example, briquettes (similar to those in Hoffmann and Fayed), in the third comparative example, broke along the grooves and split lengthwise, as shown in Table 1 and p. 22, lines 14-17 of the present application. In contrast, the compacted material of the amended claims did not split or break before entering the crusher, and additionally demonstrated improved productivity and minimal powder generation. The references fail to teach or suggest the advantages associated with the shape of the compacted material.

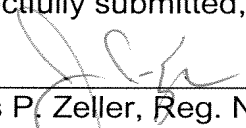
Conclusion

In view of the foregoing amendments and remarks, it is believed that the pending application is in condition for allowance, and such action is solicited.

Should the examiner wish to discuss the foregoing or any matter of form in an effort to advance this application toward allowance, he is urged to telephone the undersigned at the indicated number.

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Respectfully submitted,

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